RS-INT
M-1,R
Factor Study

Nov. 19, 1936

NOTES ON PROCEDURE OF SEEDLING HEIGHT MEASUREMENT:

The heights of ten seedlings in each bed were measured on Nov. 19-20, 1936 by Wayne Read and Edwin Mowat, one recording and one making measurements. In order to obtain representative measurements, practically free from personal bias, a rough mechanical selection was made by dividing the total number of seedlings in the bed (per last check count) by 10 and taking for measurement each seedling at this indicated interval in counting thru the bed. For example, if there were 66 seedlings in a bed, Nos. 1, 7, 14, 21, 28, 35, 42, 49, 56, and 63 were chosen for measurement. Where there was a full or nearly full number per bed (i.e., from 85 to 100), every tenth seedling was measured. In the few cases where the total number was less than about 25, the interval was varied to obtain a sampling over the entire bed. In each case the first seedling in the top row (upper left-hand corner) was taken as No. 1; the count then proceeding across the top row, thence across the second row, etc. As the count was only roughly made and in some cases the rows are poorly defined, it is not expected that the same seedlings would be measured each time if the process were repeated, altho the No. 1 seedling can usually be checked unless it dies.

Noticeably injured or deformed seedlings were not taken, the measurer passing on to the next seedling in line. As there were very few such seedlings it was not necessary to pass up many seedlings according to this rule. If normal, however, a seedling was taken regardless of size, even tho such procedure seemed at times to give undue weight to the extra large or extra small seedlings in a bed. Because of this chance of unrepresentative sampleing, the average for any individual bed may not always be a true one, but it is believed that the average for any three like beds in an enclosure should be acceptable.

The measurement was made to the nearest .1 inch by means of a home-made sliding scale gage, the end of the scale resting on the ground on a level with the base of the seedling and the lower surface of the "shelf" of the sliding arm just touching the tips of the tallest needles. Thus the measurement includes part or all of the length of the upper primary needles as well as the actual length of shoot. It would have been desirable, particularly for comparism with future measurements, to take only length to terminal bud, but as this bud was enclosed and hidden by the needles in most cases and to obtain such measurement would have taken much more time and possibly injured the tip in pulling aside the needles, the present procedure was followed. It is possible to make measurements quite rapidly by this method, as the proper contact of sliding arm and needle tips may be judged by noting the quiver of the latter as the arm is brought down against them. For comparison with future measurements which may be made to terminal bud only, it may be noted that according to a number of sample measurements, the excess of measurement with needles averages about 1.0", with a variation in individual cases from about 0.6" to 1.5". The needles thus included in length were primary needles only (a few secondary or sheath needles had developed on a few seedlings, but in a lateral rather than terminal position). On litter-covered plots the lower end of scale was made to bear firmly on the surface so as to compress the litter and thus make its influence on the measurement as small as possible - in general not over .1 to .2". Probably no allowance need be made for this factor.

A letter indicating the germination period (i.e., age) of each seedling was recorded with its height measurement. Because of unequal distribution of "color-ages", it may be impossible to include this factor in statistical analysis of results, but it may be helpful in explaining differences found under the various treatments.

E.L.M.